

On the status of *Pachycheles laevidactylus* Ortmann, 1892 (Crustacea: Decapoda: Porcellanidae)

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Abstract.—*Pachycheles laevidactylus* Ortmann, 1892, previously considered a synonym of the eastern Pacific *P. grossimanus* (Guérin-Méneville, 1835), has been found to be a distinct species. Examination of type and non-type specimens of *P. laevidactylus*, *P. grossimanus*, and the western Atlantic *P. haigae* Rodrigues da Costa, 1960 also demonstrated that *P. haigae* is a junior synonym of *P. laevidactylus*.

Guérin-Méneville (1835) briefly described the porcelain crab *Porcellana grossimana* from specimens collected in Chile; later he provided a more complete description and an illustration, and restricted the type locality to Valparaiso (Guérin-Méneville 1838). Stimpson (1858) designated *P. grossimana* as the type species for his new genus *Pachycheles*. Subsequent records indicate that *P. grossimanus* is broadly distributed along the temperate eastern Pacific coast of South America (Rathbun 1910, Haig 1955, 1960).

In his survey of the decapod crustacean collections of the Strasbourg Museum, Ortmann (1892) described *P. laevidactylus* from Brazil. Ortmann (1897) subsequently decided that this locality data was unreliable, and synonymized *P. laevidactylus* with the eastern Pacific *P. grossimanus*. He based this decision on his examination of specimens of *P. grossimanus* during a visit to the Academy of Natural Sciences in Philadelphia (ANSP). Ortmann (1897) did not provide catalog numbers for the three specimens of *P. grossimanus* he examined at the ANSP. However, during a recent visit to the ANSP collections, we could find only three specimens labelled as *P. grossimanus*. The low catalog numbers of these specimens indicate that they have been at the ANSP since at least the 1880's (G. Rosenberg,

pers. comm.) and thus are probably the same specimens studied by Ortmann. Our examination of these specimens indicates that Ortmann was correct in his assessment that they are conspecific with *P. laevidactylus*.

Unfortunately, two of the ANSP specimens also lack locality data, and the third (ANSP 4168), from the U.S. Exploring Expedition, is only labelled "Pacific Ocean." This vague labelling may be considered suspect given the extent to which specimens from this expedition were separated from their labels (Dana 1852:2). Both the types of *P. laevidactylus* and the ANSP specimens differ in several respects from the type specimen of *P. grossimanus*. Furthermore, they appear to be identical to *P. haigae* Rodrigues da Costa, 1960. We thus conclude that *P. laevidactylus* is not conspecific with *P. grossimanus* but is identical to *P. haigae*, and that therefore *P. haigae* is a junior subjective synonym of *P. laevidactylus*.

In this paper we provide diagnoses and illustrations for *P. grossimanus* and *P. laevidactylus*, and a full description of *P. laevidactylus* (see Haig 1960 for a full description of *P. grossimanus*). Material from this study came from the collections of the Academy of Natural Sciences at Philadelphia, American Museum of Natural History

(AMNH), Muséum national d'Histoire naturelle (MNHN), Musée Zoologique de l'Université Louis Pasteur et de la Ville de Strasbourg (MZS), Museu de Zoologia Universidade de São Paulo (MZUSP), Swedish Museum of Natural History (SMNH), and Natural Museum of Natural History (USNM). Carapace length (CL) is provided as an indicator of specimen size. Illustrations were created using an improved version of the approach used by Harvey (1992): specimen images were first captured on a Macintosh[™] computer with a digital camera connected to a Wild M8 dissecting microscope, then prepared for publication using the programs Adobe Photoshop[™] and Adobe Illustrator[™].

Pachycheles grossimanus
(Guérin-Méneville, 1835)

Fig. 1

Porcellana grossimana Guérin-Méneville, 1835:116; 1838:8; plate VII 26, fig. 3.

Pachycheles grossimanus: Stimpson, 1858: 228.—Haig, 1960:167–169, plate 35, fig. 1 (in part), and references therein.—Antezana et al., 1965:25–26.—Viviani, 1968:51; fig. 10, 14k. (See remarks.)

Holotype.—Chile: 1 specimen, presumably male (CL 7.8 mm), “Chili”, MNHN-Ga 3954. (See remarks.)

Additional material examined.—Chile: 1 ovigerous female (CL 17.00 mm), Montemar, near Valparaíso, 32°57'24"S, 71°33'25"W, littoral, 16 Oct 1948, Lund University Chile Expedition sta. no. M123, SMNH 15319; 1 male (CL 4.23 mm), 1 female (CL 2.38 mm), 1 juvenile (CL 1.87 mm), Tocopilla, 22°05'S, 70°13'W, littoral, 5 Jan 1949, Lund University Chile Expedition sta. no. M158, SMNH 15315; 1 female (CL 6.67 mm), 4 juveniles (CL 2.16–2.88 mm), Cavancha, S of Iquique, 20°14'07"S, 70°10'05"W, littoral, 5 Jul 1949, Lund University Chile Expedition sta. no. M135, SMNH 15316; 5 males (CL 5.60–14.58 mm), 3 females (CL 5.65–6.61 mm), 8 juveniles (CL 2.68–5.36 mm), Ba-

hía San Vicente, 36°43'36"S, 73°08'10"W, littoral, 9 Jun 1949, Lund University Chile Expedition sta. no. M121, SMNH 15317; 1 male (CL 21.00 mm), 1 female (CL 12.89 mm), Canal Chacao, 41°46'30"S, 73°45'45"W, 40 m, 4 May 1949, Lund University Chile Expedition sta. no. M94, SMNH 15318; 3 males (CL 5.78–7.71 mm), 6 females (CL 6.63–9.28 mm), 40 juveniles (CL 1.96–3.93 mm), Peninsula Coquimbo 29°55'56"S, 71°21'08"W, littoral, 24 Jun 1949, Lund University Chile Expedition sta. no. M127, SMNH 15320; 1 male (CL 17.00 mm), numerous juveniles (CL 1.96–4.17 mm), Puerto Mejillones del Sur, 23°06'30"S, 70°28'00"W, 0–0.5 m, 30 Jun 1949, Lund University Chile Expedition sta. no. M129, SMNH 15321.

Peru: 1 female (CL 5.83 mm), Chíncha, N. island, from seaweed, 18 Jun 1907, coll. R. E. Cocker, USNM 40477; 1 male (CL 18.41 mm), Callao, MNHN-Pg 5321.

Diagnosis.—Carapace with lateral margins parallel. Front rounded in dorsal view; dorsal surface with tuft of setae. Lateral walls of carapace consisting of 1 large anterior piece, 1 large posterior piece, and several small posterior fragments. Basal segment of antennule armed with up to 3 tubercles on medial anterior margin, and few flattened granules on anterolateral dorsal surface. Carpus and manus of chelipeds with rounded, indistinct posterior margins and large, densely packed granules forming irregular rows near posterior margin. Carpus with anterior crest granular to serrate, divided by notch into broad proximal tooth and acute subdistal tooth. Manus with large granular tubercle near base of pollex. Walking legs densely setose. Telson 7-plated, sometimes incompletely so. Second pleopods present in males.

Distribution.—Callao, Peru to Canal Chacao, Chile; primarily intertidal; exceptionally to 40 m (Haig 1960).

Remarks.—Guérin-Méneville (1835, 1838) did not specify where his specimens were deposited, but Prof. Jacques Forest

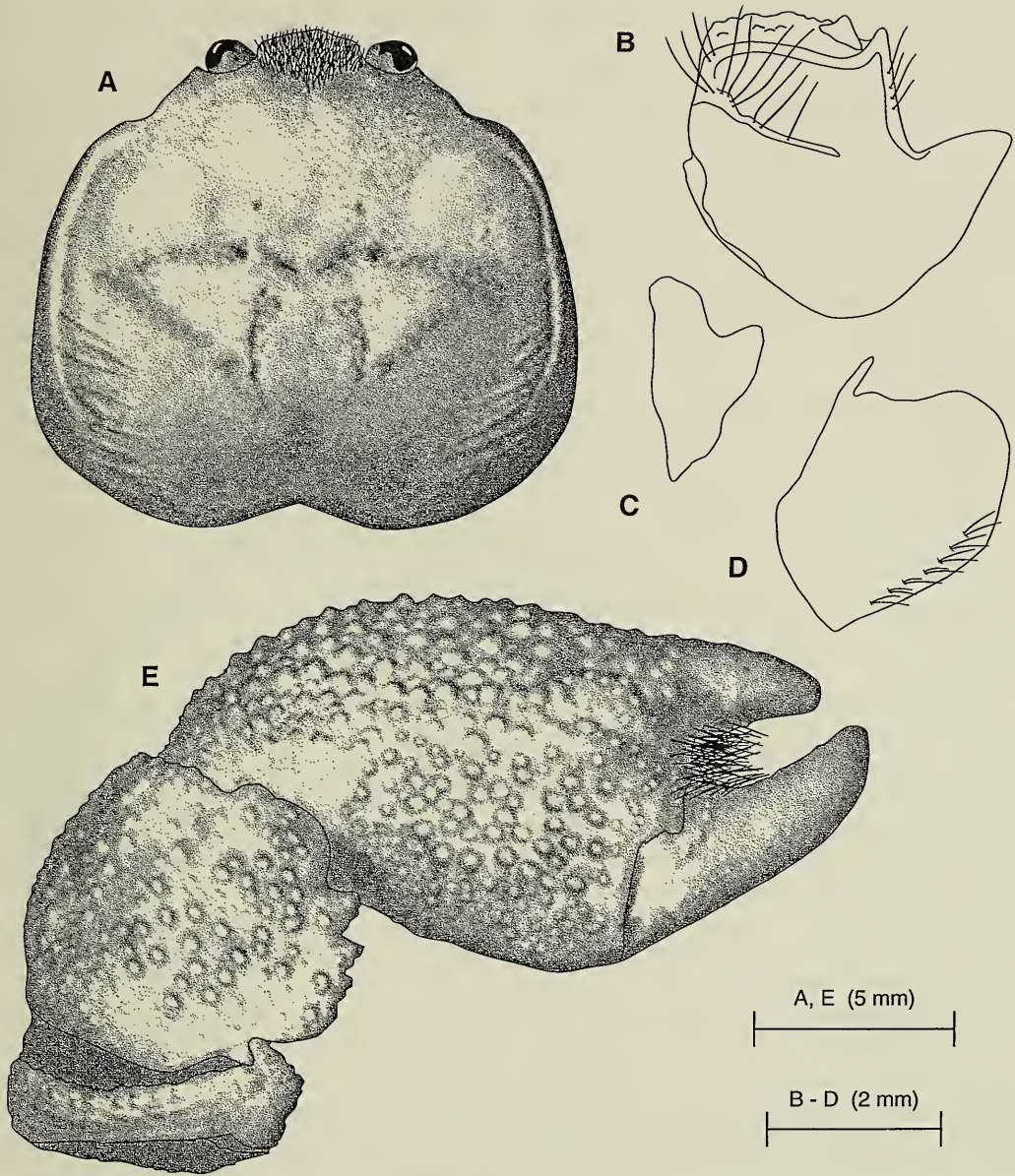


Fig. 1. *Pachycheles grossimanus* (Guérin-Méneville, 1835); male, USNM 98288. A, carapace; B, basal segment of right antennule, ventral view; C, merus of right outer maxilliped, ventral view; D, ischium of right outer maxilliped, ventral view; E, major cheliped.

and Dr. Nguyen Ngoc-Ho (in litt.) of the MNHN concur that the single dry specimen was part of Guérin-Méneville's collection and is most likely the holotype. We could not determine the sex of the holotype with certainty because the specimen is glued to a wooden base.

Pachycheles grossimanus co-occurs with *P. crinimanus* Haig, 1960 in Peru (see Haig 1960 for distinguishing characteristics of these species), but otherwise appears to be the only *Pachycheles* in its range. Haig (1960) recorded ANSP 4168 as *P. grossimanus*, as did Ortmann (1897), but this

specimen is in fact referable to *P. laevidactylus* (see below).

Pachycheles laevidactylus Ortmann, 1892
Fig. 2

Pachycheles laevidactylus Ortmann, 1892:
266. plate 12, fig. 1.

Pachycheles grossimanus: Ortmann, 1897:
292.—Haig, 1955:43–44 (in part); 1960:
167, plate 35, fig. 1 (in part). (See re-
marks.) [Not *P. grossimanus* (Guérin-
Méneville).]

Pachycheles haigae Rodrigues da Costa,
1960:21, figs. 1–4.—Boschi, 1963:31,
figs. 1, 3; 1979:137; 1981: 735.—Boschi
et al., 1967:6; 1992:56.—Bremec & Caz-
zaniga, 1984, fig. 2.—da Silva et al.,
1989, figs. 2, 11.

Syntypes.—1 male (CL 9.04 mm), 1 fe-
male (CL 8.43 mm), no collection data,
MZS 380.

Additional material examined.—Brazil: 2
males (CL 4.85–7.93 mm), 1 female (dam-
aged), Gragoatá, Rio de Janeiro, coll. H. R.
Costa, Aug 1959, MZUSP 10593; 3 males
(CL 5.40–6.25 mm), 1 ovigerous female
(CL 5.67 mm), Abrolhos, Bahia, coll. H. R.
Costa, 3 Feb 1957, MZUSP 10594; 3 males
(3.96–8.26 mm), 2 ovigerous females
(6.04–10.40 mm), Isla de São Francisco,
Santa Catarina, coll. F. H. A. Costa, 31 Jul
1989, MZUSP 9984; 6 males (CL 2.74–
10.96 mm), 6 females (CL 2.50–8.67 mm),
3 juveniles (CL 1.67–1.73 mm), Paronopia
Beach, São Vicente, shore, coll. C. V. Mich-
eletti, 4 Oct 1994, AMNH 17451; 2 males
(CL 9.40–10.72 mm), Rio De Janeiro,
MCZ 11848; 1 female (CL 5.12 mm), Vi-
tória, coll. Hartt and Copeland, Thayer Ex-
pedition, MCZ 11849; 10 males (CL 4.23–
9.52 mm), 8 ovigerous females (CL 4.29–
7.35 mm), Ilhas De Sante Anna, coll. Hartt,
MCZ 11850; 1 male (CL 8.67 mm), re-
ceived in 1865 from Smithsonian Institu-
tion, U.S. Exploring Expedition, MCZ
1395.

Uruguay: 3 males (CL 9.40–11.33 mm),
3 females (CL 9.88–13.01 mm), Isla De Lo-

bos, 8 Jul 1953, on the coast after storm,
coll. Leoncio Sanabria, USNM 99851.

“Pacific Ocean” (but see remarks): 1
male (CL 10.46 mm), U.S. Exploring Ex-
pedition, ANSP 4168.

No locality data: 2 females (CL 8.81–
10.67 mm), ANSP 740.

Diagnosis.—Front triangular in dorsal
view; dorsal surface with tuft of setae. Lat-
eral margins of carapace consisting of 1
large anterior piece, 1 large posterior piece,
and usually several small posterior frag-
ments. Basal segment of antennule armed
with 3 to 5 strong spines on medial anterior
margin, and 2 to 4 spines on the anterolat-
eral dorsal surface. Carpus and manus of
chelipeds with posterior submarginal fur-
row, scattered long setae, and small, evenly
spaced granules. Carpus with anterior crest
divided by notch into broad proximal tooth
and acute subdistal tooth; dorsal surface
with 3 lateral longitudinal ridges, each
topped with row of enlarged granules. Ma-
nus with large, elongate, granular tubercle
near base of pollex. Walking legs with se-
tose margins. Telson 5-plated. Second ple-
opods present in males.

Description.—Carapace (Fig. 2A) about
as broad as long in males, slightly broader
than long in females; posterolateral margins
convex; dorsolateral ridges pronounced;
dorsal surface with posterolateral regions
plicate; posterior margin curving inward
medially; dorsal surface nearly naked ex-
cept for tuft of short plumose setae on fron-
tal region. Front triangular in dorsal view,
trilobate in frontal view; median lobe pro-
jecting farther than lateral lobes; with me-
dian groove dorsally. Outer orbital angle
produced into an acute tooth, inner orbital
angle slightly pronounced. Orbits deep, and
broad; eyes large. Lateral margins of cara-
pace (Fig. 2B) consisting of 1 large anterior
piece, 1 large posterior piece, and usually
several small posterior fragments.

Basal segment of antennule (Fig. 2C)
armed with 3 to 5 spines (the type male has
2 spines on the right basal antennular seg-
ment, 3 on the left) on medial anterior mar-

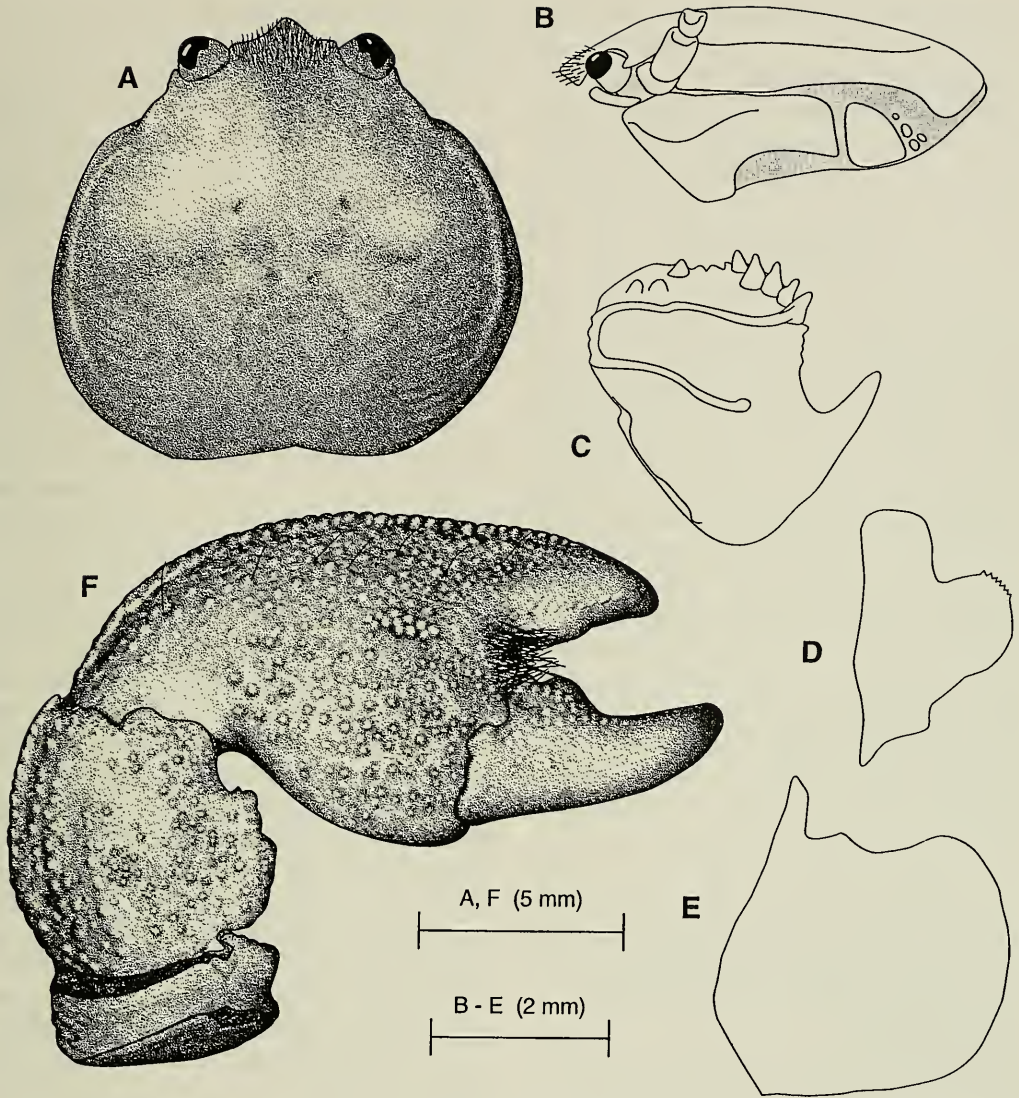


Fig. 2. *Pachycheles laevidactylus* Ortmann, 1892; male, USNM 99851. A, carapace; B, left side wall of carapace; C, basal segment of right antennule, ventral view; D, merus of right outer maxilliped, ventral view; E, ischium of right outer maxilliped, ventral view; F, major cheliped.

gin (visible from dorsal view); with 2 to 4 spines on anterolateral dorsal surface; dorsal surface with 2 transverse granular lines. Second segment of antenna with distal tubercle on anterior margin; third segment granular, sometimes more pronounced near distal and proximal margins. Flagella with minute setae.

Third maxillipeds with moderately deep,

trilobate sternite; median lobe of sternite equalling or slightly exceeding lateral lobes; ischium (Fig. 2E) with medioproximal angle only slightly obtuse, almost right-angled; merus (Fig. 2D) with pronounced medial lobe, subquadrate in shape, and usually dentate anteriorly.

Chelipeds unequal in size (major: Fig. 2F). Merus with granular tooth on anterior

margin, projecting about as far as carpus teeth; ventral margin of merus distinct, ventrodistal angle usually with 2 small granules. Carpus and manus with weak submarginal furrow on posterior margins, and scattered long plumose setae towards posterior margins; with very short, often vestigial, plumose setae arising in groups from distal side of larger granules. Carpus with crest on anterior margin, divided by notch into broad proximal tooth and somewhat acute subdistal tooth; dorsal surface covered with small granules, more pronounced near posterior margin; surface with 3 longitudinal ridges, each topped with row of enlarged granules; 1 ridge is medial, 2 close together between medial ridge and lateral margin; dorsal surface with few long plumose setae. Manus covered with small granules; large, elongate, granular tubercle near base of pollex; fingers with smaller, flattened granules on minor chela, nearly smooth on major chela. Major manus nearly lacking pubescence dorsally; ventral surface of manus with tuft of setae at base of fingers; pollex pubescent, with single medial tubercle on cutting edge; dactyl pubescent on distal half, cutting edge with basal tubercle; fingers gaping, crossing at tips. Minor cheliped with at most trace of setation on dorsal surface, outer margin with long bristles; fingers meeting entire length of cutting edge, crossing at tips.

Walking legs with scattered setae on anterior margins of merus, carpus, and propodus. Anterior margin of carpus with 1 small tubercle and 2 granules distally. Propodus with 4 moveable spines ventrally: 2 distal, 1 subdistal, and 1 medial; dactyl with 3 corneous spines along ventral margin.

Abdomen smooth; telson with five plates in males and females. Second pleopods present in males.

Distribution.—Pernambuco, Brazil to Monte Hermoso, Argentina (39°00'S, 61°16'W); intertidal to 12 m.

Remarks.—Although Ortmann (1982) cited Brazil as the type locality in his description of *P. laevidactylus*, he later (Ort-

mann 1897) noted that the specimens lacked acquisition data, and thus could not safely conclude where they came from. Unfortunately, locality data is also lacking for two of the three ANSP specimens that led Ortmann to synonymize *P. laevidactylus* with *P. grossimanus*, and the locality of the third specimen (i.e., "Pacific Ocean") is vague and open to question.

The syntype specimens of *P. laevidactylus* differ from *P. grossimanus* in numerous respects (because the holotype of *P. grossimanus* is dry, fragile, and glued to a frame, most of the following comparisons are based on non-type specimens of *P. grossimanus* that we established to be conspecific with the holotype). In *P. grossimanus*, the front of the carapace has a rounded anterior margin (Fig. 1A); the lateral margins of the carapace are parallel (Fig. 1A); the basal segment of the antennule has three or fewer tubercles on the distal margin and at most a few flattened granules on the anterolateral surface (Fig. 1B); in the outer maxillipeds, the medial lobe of the merus is obliquely subtriangular (Fig. 1C), and the medioproximal angle of the ischium is broadly obtuse (Fig. 1D); the chelipeds (Fig. 1E) lack submarginal furrows, and are more densely covered with larger granules; the margin of the anterior crest of the carpus of the chelae is granular to serrate; the walking legs are densely setose; and the telson is seven-plated, although the anterior plates are sometimes partially fused.

We could not examine type specimens of the western Atlantic *P. haigae* for this study. The holotype was deposited at the Instituto Oceanográfico, which apparently no longer exists (G. de Melo, pers. comm.), and the location of the holotype is unknown. Several paratypes are deposited at the Museu Nacional, which was unfortunately closed due to a strike during this study. However, we were able to examine several specimens of *P. haigae* from the type locality and two other localities (Abrolhos and Isla de São Francisco),

where paratypes were collected, including part of Rodrigues da Costa's collections, which were donated to the MZUSP after his death.

Whereas *P. laevidactylus* is easily distinguished from *P. grossimanus*, we can find no differences between *P. laevidactylus* and *P. haigae*, and must conclude that *P. haigae* is a junior subjective synonym of *P. laevidactylus*. Thus, whether or not Ortmann's type material came from Brazil, *P. laevidactylus* is currently known only from the western Atlantic.

The tuft of setae on the front of the carapace distinguishes *P. laevidactylus* from all other species in the western Atlantic except *P. chubutensis* Boschi, 1963 and *P. monilifer* Dana, 1852. In *P. chubutensis* the front is rounded, and the lateral walls of the carapace consist of a very large anterior piece and only a single small posterior fragment. In *P. monilifer*, the basal segment of the antennule lacks obvious spination, and males lack pleopods.

Cheliped morphology can also easily distinguish *P. laevidactylus* from other western Atlantic species of *Pachycheles*. Unlike *P. laevidactylus*, several species (*P. ackleianus* A. Milne-Edwards, 1880; *P. monilifer*; *P. rugimanus* A. Milne-Edwards, 1880; and *P. susanae* Gore & Abele, 1973) have heavily sculptured chelipeds; *P. pilosus* (H. Milne-Edwards, 1837) has spiny, setose chelae, whereas the chelae of *P. riisei* (Stimpson, 1858) are smooth and shiny. In *P. greeleyi* (Rathbun, 1900), *P. serratus* (Benedict, 1901), *P. chacei* Haig, 1955, and *P. cristobalensis* Gore, 1970, the chelae lack submarginal furrows, the enlarged tubercle at the base of the pollex, and the tuft of setae between the fingers; they also are more evenly covered with granules than those of *P. laevidactylus*, and the anterior crest of the chelae carpus consists of small granular teeth in these species. The chelae of *P. chubutensis* are similar to those of *P. laevidactylus*, but the granules are smaller and more evenly spaced, the tubercle at the base of the pollex is absent, and the teeth

of the anterior carpal crest are irregular and serrate. Furthermore, in *P. chubutensis* the dorsal surface of the carpus and manus is usually covered with short dense setae, but this varies considerably and we have seen virtually naked individuals.

Acknowledgments

For access to the types of *P. laevidactylus*, we thank Elisabeth Lang of the MSZ. We also thank Raymond B. Manning and Rafael Lemaitre (USNM), Lennart Sandberg (SMNH), Gustavo A. S. de Melo (MZUSP), Gary Rosenberg (ANSP), and Nguyen Ngoc-Ho and Jacques Forest (MNHN), for providing specimens and suggestions, and Carla Valéria Micheletti, at the Universidade Estadual Paulista, for providing freshly collected specimens of *P. laevidactylus*. Thanks also to Lara Tolchin, who assisted with the illustrations. This work was supported by a NSF Research Experience for Undergraduates fellowship (E. M. De Santo), which was extended by the AMNH.

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